Karthik Pullalarevu

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EDUCATION

Carnegie Mellon University   **Pittsburgh, PA**
Master of Science in Computer Vision   *December 2026*
Coursework: Learning for 3D Vision, Advanced Computer Vision, Intro to Robot Learning

Vellore Institute of Technology   **Chennai, India**
Bachelor of Science in Computer & Electronics Engineering | GPA: 3.67/4.00   *June 2022*

SKILLS

Programming Languages: Advanced: Python; Basic: C++, C, Java
Libraries: Advanced: PyTorch, NumPy, Pandas, Huggingface Transformers, Docker, ONNX; Basic: Tensorflow
Computer Vision: Advanced: Vision Transfomers, Diffusion models, Novel View Synthesis, Neural Radiance Fields, Semantic Segmentation, 3D Reconstruction, Monocular Depth Estimation, Multimodal Models, GANs

PROFESSIONAL AND RESEARCH EXPERIENCE

Carnegie Mellon University   **Pittsburgh, PA**
Research Assistant [Advisor: Prof. Jeffrey Ichnowski]   *August 2025 - Present*

- Developing test-time 3D reconstruction methods for shape completion to improve downstream robotic grasping performance by using visual prompt tokens and LoRA for accurate surface reconstruction.

Hyperverge   **Bangalore, India**
Lead Machine Learning Engineer (MLE 3)   *January 2022 - August 2025*

- Developed custom multi-modal vision transformer models for face-spoof and deepfake detection, achieving **0.15% FAR** and **0.06% FRR**, serving **20 million verifications monthly** in production and resulting in three US patents.
- Designed a dense embedding retrieval pipeline using contrastive learning and nearest neighbor search with **20ms latency,** enabling real-time fraud-pattern clustering and reducing sudden fraud-inflow detection time to **15 minutes**.
- Finetuned a TimeSformer model with monocular depth and optical flow for video-based spoof detection, boosting **precision by 3%**, prototyped 3D facial reconstruction from selfie sequences using the same multimodal pipeline.
- Reduced model size by **91%** (**335MB to 28MB**) and improved CPU **inference latency by 60%** through post-training quantization, knowledge distillation and pruning; deployed optimized models on-device via ONNX Runtime / TFLite.
- Built late-fusion anomaly detection models using mobile sensor data, depth and RGB for real-time fraud detection.
- Created an in-house synthetic dataset for eyewear detection by overlaying transparent frames onto facial images, and deployed a lightweight multi-branch MobileNet model with **99.8% precision**, **100% recall** and **5.8ms latency**.
- Automated hiring process by building an LLM powered agent for parsing resumes, scoring candidates and conducting automated AI interviews using speech to text and text to speech, **cutting hiring time by 95%** and **cost by 65%.**

Tata Consultancy Services - Research Labs   **Noida, India**
Research Intern   *May 2021 - August 2021*

- Built 2D/3D U-Net models to segment hepatic vessels from CT scan for non-invasive diagnosis of portal hypertension.
- Applied preprocessing techniques like contrast enhancement, windowing, and domain adaptation from veins to vessels, achieving a **Dice score of 0.53**. Tech stack: Convolution Neural Networks, Image Processing

PUBLICATIONS & PATENTS

[1] **Karthik, P.**, et al. Semantic segmentation for plant phenotyping using advanced deep learning pipelines. **Multimedia Tools & Applications** [10.1007/s11042-021-11770-7]
[2] Method and System For Determining Liveness of a Subject. **[3 US Patents]** [USPTO 20250104480]

PROJECTS

Multiview pose synthesis from 2D objects   *September 2024 - October 2024*

- Developed an end-end pipeline for novel pose estimation using text-guided segmentation, image to 3D view generation followed by Stable Diffusion Inpainting using azimuth and polar values.
- Proposed Grounding SAM model for prompt based object detection leading to 6% higher accuracy on segmentation.

Spectral alignment of brain mesh surfaces   *August 2021 - December 2021*

- Awarded the MITACS Fellowship and interned at ETS Montreal, Canada. Contributions to research on Graph CNNs for cortical shape analysis, increasing brain parcellation accuracy by 3%.